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I hereby declare that all the statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the patent application issued thereon.

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Full name of the translator :

Wendy Elizabeth LIGHT

For and on behalf of RWS Group Ltd

Post Office Address :

Europa House, Marsham Way,

Gerrards Cross, Buckinghamshire,

England.

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DescriptionMethod and device for packing objects

[0001] The invention relates to a method and a device
5 for packing objects.

[0002] There are situations where certain objects, for
example during an industrial production process, have
to be produced at a certain site and transported to
10 another location. This location may also be remote,
that is to say not within the same plant or factory.
The important factor here is that the packing takes
place such that the packed objects can be reintroduced
into the production process. Of course, it is also
15 intended for the packing to take up as little space as
possible.

[0003] DE 19505277 A has already disclosed a method and
a device for the interim storage of flat objects, the
20 latter being stacked sections of tubing. In the case of
this known method, the objects are wound up in reels
with the aid of a film web. In order to prevent the
individual stacks from being displaced during the
winding-up operation, the core contains a step.

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[0004] The object of the invention is to make it
possible to pack objects in a space-saving manner such
that a production process is disrupted as little as
possible during both packing and unpacking.

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[0005] In order to achieve this object, the invention
proposes a method having the features of claim 1 and/or
a device having the features of claim 8. Developments
of the invention form the subject matter of subclaims.

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[0006] The objects which are to be packed are supplied
one behind the other. This arrangement in a row, or
also in a number of parallel rows one beside the other,
can take place directly during the production process.

The objects are then positioned individually on the band. The band is then wound up such that the objects end up located between two turns of the band. The objects are secured and packed in this way. A resulting 5 roll can then be transported as a whole, not much space being required for this purpose. At the location where the objects are to be processed further, the roll can be unwound again, with the result that the packed objects can then be removed in reverse order one behind 10 the other.

[0007] In a development of the invention, it may be provided that the individual articles are spaced apart from one another. This spacing may be produced, for 15 example, during the production process. It does not result in an increase in size of the packing unit since, at the locations where no object is wound up, two turns of the films simply butt directly against one another, which takes up virtually no space. As the 20 objects are unpacked at the further-processing location, they are then spaced apart again by the same distance as prior to the winding-up operation. This can be deliberately exploited in some circumstances if, during the further processing, the objects are actually 25 to be spaced apart by a certain distance.

[0008] In order to secure the objects particularly reliably, it may be provided according to the invention that the band is wound up under tensioning. If the band 30 used is one which can expand somewhat, this gives rise to a reliable and durable securing action which does not loosen even during transportation. In particular, it is, of course, possible to use a plastic film as the band.

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[0009] The tensioning may be produced, for example, by the band being braked as it is wound up.

[0010] A single band may be used according to the invention, with the result that the objects are secured between two layers of the same band.

5 [0011] However, it is likewise possible, and lies within the context of the invention, to introduce the objects between two bands, which are then wound up together. This has advantages when there is a risk of the objects slipping during the winding-up operation.

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[0012] In particular, it may be provided that use is made of a band which is wider than the objects. It is precisely when the winding-up operation takes place under tensioning that the objects are thus also secured against slipping laterally.

15 [0013] The invention proposes to wind up the band onto a core, in order that the first objects are not subjected to excessive deformation.

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[0014] If the objects are ones which can be compressed, this packing method helps to save a particularly large amount of space since the objects can be automatically compressed during the winding-up operation.

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[0015] The device proposed by the invention contains a holder for an unwinding reel and a holder for a winding-up reel. A reel with band is positioned on the unwinding reel, the band being guided from there to the winding-up reel and being secured on the latter. A drive is provided in order to rotate the winding-up reel such that the band is wound up on the winding-up reel. An accommodating location is provided at a certain point where the individual objects can be positioned on the band, with the result that, during transportation of the band, they are then carried along by the latter and wound up.

[0016] The part of the film web which leads from the accommodating location to the winding-up reel may, according to the invention, lead over a supporting means, for example a possibly planar or else curved plate, in order to prevent the band from sagging under the weight of the objects which are to be packed. This supporting means may be designed such that it is carried along as the diameter of the winding-up reel changes, that is to say it runs tangentially to the winding-up reel.

[0017] If the band is wound up, there is a change in diameter of the roll both on the winding-up reel and on the unwinding reel. The change in diameter is greater for the winding-up reel since, there, the objects are also wound up. In order then to ensure that the objects which are to be packed can always be positioned at the same location, it may be provided, in a development of the invention, that a deflecting roller is arranged between the unwinding reel and the winding-up reel. This deflecting roller may advantageously be arranged such that the accommodating section for the objects is arranged directly downstream of the deflecting roller, as seen in the transporting direction of the band which is to be wound up. The supporting means mentioned in the introduction can then begin in the region downstream of this supply location.

[0018] If use is made of a single band, for example a plastic film web, the objects which are to be packed are supplied on that side of the film which later forms the inside during the winding-up operation. The objects are thus secured between the not yet wound-up part of the band and the last turn of the already wound-up band. It is possible here, depending on the size of the objects, for slipping to occur in unfavorable circumstances. In order to prevent this in cases where such slipping can actually occur, it may be provided,

- in a development of the invention, that the device has a mount for a second unwinding reel. From this second unwinding reel, a second band leads to the winding-up reel, to be precise in such a manner that the objects
5 are arranged between the two bands. If use is made of two bands, it is possible for the securing action between the two bands to take place gradually, this reducing the risk of slipping.
- 10 [0019] It is also possible to provide a deflecting roller for the second band, in order to ensure that there is no change in the geometrical relationships at the supply location during the packing operation.
- 15 [0020] The supply location or accommodating location for the objects may preferably be arranged in an essentially horizontally running manner, based on the objects being transported up essentially horizontally. It is also conceivable, however, depending on the way
20 in which the objects are produced and/or transported up, for the supply location also to be arranged at a different angle.
- [0021] The band used, as has already been mentioned, is
25 preferably a plastic film which may have, or is intended to have, the desired properties. These include, in particular, the expansion capability and the compatibility with the objects which are to be packed.
- 30 [0022] In order, during the winding-up operation, for the objects to be compressed and/or secured under tensioning, it is possible for a braking means, which acts at least on the first band, to be provided
35 according to the invention.
- [0023] The invention likewise proposes a packing unit which contains a band roll, between the turns of which

objects are secured under tensioning, the objects preferably being narrower than the band roll.

5 [0024] Such a packing unit can be used, in particular, as an interim store for objects between two different stages of a production process.

10 [0025] Further features, details and advantages of the invention can be gathered from the following description of a preferred embodiment of the invention, from the patent claims and from the abstract, which is worded in relation to the contents of the description, and with reference to the drawing, in which, schematically in each case:

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[0026] Figure 1 shows a view of a device for packing individual objects in a winding-up station; and

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[0027] Figure 2 shows, on an enlarged scale, the location where the objects which are to be packed are introduced between two bands.

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[0028] Figure 1 shows, schematically, a winding-up reel 1 which is arranged such that it can be rotated about a spindle 2. The winding-up reel 1 has a core 3. A drive, for example a motor, which is not illustrated, serves for driving the winding-up reel 1 in the direction of the arrow 4. The spindle 2, about which the winding-up reel 1 is rotated, runs horizontally.

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[0029] The device contains a feed means 5 which, in the example illustrated, has a horizontal plate 6. The objects which are to be packed are conveyed up one behind the other on this plate 6.

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[0030] The device also contains a first unwinding reel 7 and a second unwinding reel 8. The two reels are held such that they can be rotated about spindles which run

parallel to the spindle 2 of the winding-up reel 1. In each case one band 9, 10 is wound up on the two reels 7, 8, the band leading from these two unwinding reels to the winding-up reel 1. There, the ends of the bands 5 are connected to the core 3. Provided between the unwinding reel 7 and the winding-up reel 1 is a deflecting roller 11, which is arranged directly downstream of the plate 6. A second deflecting roller 12 is provided between the unwinding reel 8 and the 10 winding-up reel 1.

[0031] Arranged downstream of the deflecting roller 11, in extension of the plate 6, on which the objects which are to be packed are conveyed up, is a horizontal part 15 which forms a kind of extension to the plate 6. At this location 13, the objects 14 which are to be packed, see figure 2 subsequently, can be positioned on the band 9. A further plate 15, which can be pivoted, then begins approximately at the connecting location of the 20 spindles of the two unwinding reels 7, 8. The plate is long enough to extend somewhat beyond the spindle 2 of the winding-up reel 1. The plate is arranged such that it can be pivoted by the drive. The pivoting is controlled such that the plate butts tangentially 25 against the roll of the wound-up band. The band 9, from the supply location 13 to the winding-up reel 1, thus always runs over the plate 15. The plate 15 thus forms a support for that part of the band 9 which is not yet wound up, but on which objects are already located.

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[0032] Let us now look at figure 2, which shows a simplified and enlarged illustration of how the objects are introduced between the two bands 9, 10.

35 [0033] The objects 14, which arrive from the right in figure 2, pass slowly into engagement between the two bands 9, 10. As the winding-up reel 1 continues to rotate, the objects are drawn increasingly further

between the two bands 9, 10 and are secured there. If the objects are compressible objects, it is possible for them, depending on the braking of the two bands 9, 10, to be compressed to a more or less pronounced extent.

[0034] In order to produce the tensioning which is desirable for securing and/or compressing the objects 14, the holders for the unwinding reel 7, 8 can be braked. This can be achieved, for example, by brake motors or servomotors.

[0035] The angle between the course taken by the two bands 9, 10 at the location where the objects 14 pass into engagement between the two bands is determined, on the one hand, by the arrangement of the deflecting rollers 11, 12 and, on the other hand, by the diameter of the roll on the winding-up reel 1. The greater the distance of the winding-up reel 1 from the two deflecting rollers 11, 12, the smaller is in the influence of the diameter of the roll on the winding-up reel on this angle.

[0036] The device could also operate with just one band 9. In this case, the articles 14 are secured between the band 9 in the region 13 and the already wound-up part of the band.

[0037] When use is made of two bands, as is illustrated in the drawings, it would also be possible for the winding-up reel 1 to be arranged beneath the supply location 13 and to be operated in the opposite direction.

[0038] The present description has described how the device operates for winding up the objects. If the device has been used to produce a packing roll, the latter is transported to the location where the objects

are to be processed further. For this purpose, it is possible to use a device of the same design or, in other words, the device which has been illustrated and described can also be used for unpacking purposes. It
5 is then operated in reverse. The reels 7 and 8 are then winding-up reels and the reel 1 is an unwinding reel. The drive for the reel 1 then acts as a braking means, while the drives for the reels 7 and 8, which have been referred to thus far as brake motors, operate in the
10 opposite direction of rotation and unwind the roll. The objects 14 are then relieved of tensioning at the location which is illustrated in figure 2. They are transferred to the table 6, from where they can be transported for further processing.

Patent claims

1. A method for packing objects (14), having the following method steps:

5 1.1 the objects (14) are arranged individually in a row one behind the other,

1.2 from the start of the row onward, the objects (14) are moved onto a band (9),

10 1.3 the band (9) is wound up such that the objects (14) are enclosed between two layers of the band (9).

2. The method as claimed in claim 1, wherein the objects (14) are spaced apart one behind the other.

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3. The method as claimed in claim 1 or 2, wherein the band (9, 10) is wound up under tensioning.

20 4. The method as claimed in one of the preceding claims, wherein a single band (9) is used.

5. The method as claimed in one of claims 1 to 3, wherein the objects (14) are secured between two bands (9, 10).

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6. The method as claimed in one of the preceding claims, wherein use is made of a band (9, 10) which is wider than the objects (14).

30 7. The method as claimed in one of the preceding claims, wherein the band (9, 10) is, or the two bands are, wound up onto a core (3).

8. A device for packing objects (14), having

35 8.1 a holder for accommodating an unwinding reel (7, 8) for a band (9, 10),

8.2 a holder for accommodating a winding-up reel (1) for the band (9, 10),

- 8.3 a drive for rotating the winding-up reel (1), it being the case that
- 8.4 a band section leading from the circumference of the unwinding reel (7) to the circumference of the
- 5 winding-up reel (1) remains free for accommodating an object (14).
9. The device as claimed in claim 8, having a support for the accommodating section of the band (9), this
- 10 support changing its position as the diameter of the band roll on the winding-up reel (11) at any one time changes.
10. The device as claimed in claim 8 or 9, having a deflecting roller (11) between the unwinding reel (7) and the winding-up reel (1).
11. The device as claimed in claim 10, wherein the accommodating section (13) is arranged downstream of the deflecting roller (11), as seen in the transporting direction of the wound-up band.
12. The device as claimed in one of claims 8 to 11, having a mount for a second unwinding reel (8), a band
- 25 (10) which leads from this reel (8) to the winding-up reel (1) being arranged on the accommodating side of the first band (9).
13. The device as claimed in claim 12, having a deflecting roller (12) for the second band (10).
14. The device as claimed in one of claims 8 to 13, having a means for producing and/or maintaining tensioning at least in the first band (9) between the
- 35 winding-up reel (1) and the unwinding reel (7).
15. The device as claimed in one of claims 8 to 14, wherein the supply location (13) for the objects (14)

is arranged in an essentially horizontally running manner.

16. A packing unit containing a band roll, between the
5 turns of which objects (14) are secured under
tensioning, the objects (14) preferably being narrower
than the band roll.

17. Use of a packing unit as claimed in claim 16 as an
10 interim store for objects (14) between the various
stages of a production process.

Abstract

For the space-saving packing of individual objects supplied one behind the other, it is proposed to introduce these objects between two bands and to wind up these bands under tensioning onto a core. If the objects are compressible objects, they may be compressed in the process, with the result that the amount of space required is further reduced.

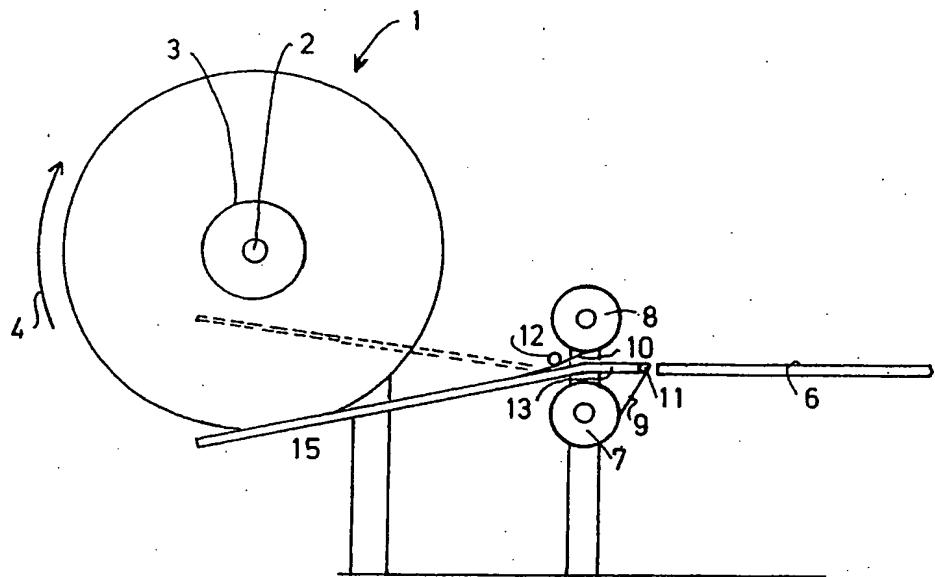


FIG. 1

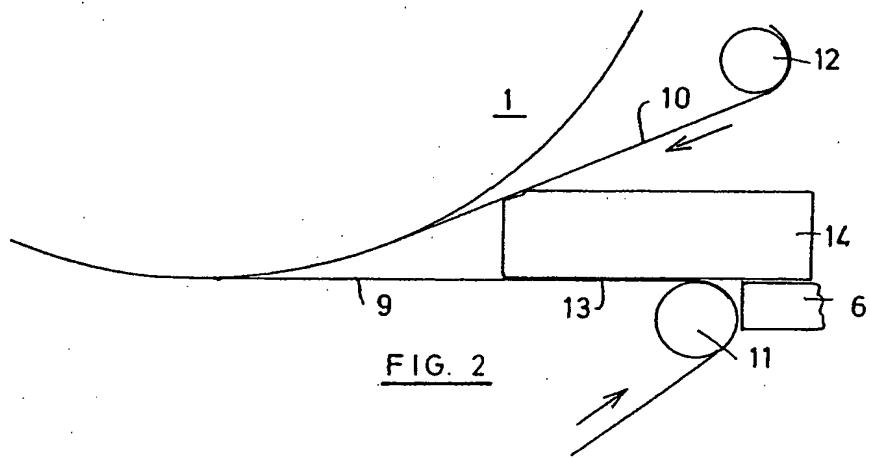


FIG. 2